

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Pond Sealing or Lining

Flexible Membrane

(Number)

Code 521A

DEFINITION

A manufactured hydraulic barrier consisting of a functionally continuous sheet of synthetic or partially synthetic, flexible material.

PURPOSES

To control seepage from water and waste impoundments for water conservation and environmental protection.

CONDITIONS WHERE PRACTICE APPLIES

On ponds and water storage structures that require treatment to control seepage rates within acceptable limits.

On waste storage and waste treatment facilities built in or of excavated earth, and which require treatment to prevent the migration of contaminants from the site.

CRITERIA

Structures to be lined shall have been constructed to meet all applicable NRCS FOTG standards for Irrigation Regulating Reservoirs (552), Irrigation Storage Reservoirs (436), Ponds (378), Waste Treatment Lagoons (359), Waste Storage Facilities (313) or Constructed Wetlands (656), as appropriate. All work planned shall be in

compliance with federal, state, and local laws and regulations.

Inlets, outlets, ramps and other appurtenances may be installed before, during or after the liner placement, but shall be done in a manner that does not damage or impair the proper operation of the liner.

The manufacturer of flexible membranes shall provide written certification of all of the following items:

1. The suitability of the material for the intended use.
2. The expected service life of the flexible membrane under the anticipated conditions.
3. The physical properties of the liner as to meeting the requirements of the appropriate ASTM standards.

Minimum Criteria for Membranes	
Type	Limiting Parameter
HDPE	40 mil thickness
LLDPE	40 mil thickness
PVC	30 mil thickness
GCL	0.75 lb/ft ² (bentonite)
EPDM	45 mil thickness

HDPE High Density Polyethylene
 LLDPE Linear Low Density Polyethylene
 PVC Polyvinyl Chloride
 GCL Geosynthetic Clay Liner
 EPDM Ethylene Propylene Diene Terpolymer Rubber Membrane

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service State Office, or download it from the electronic Field Office Technical Guide for your state.

Design of the flexible membrane shall be in accordance with manufacturer recommendations. All flexible membrane installations shall meet the material and installation requirements of the plans and specifications.

Upon completion of liner installation, the contractor shall provide a letter stating that the liner was installed according to the plans and specifications and the manufacturer's recommendations.

Select soil materials shall be used as cover for liners where required for the proper performance, protection, and durability of the installation. Cover soils shall not contain sharp, angular stones or any other objects that could damage the liner. Maximum allowable particle size of soil cover material shall be 3/8-inch (10 mm), unless the liner is cushioned by a needle punched, non-woven geotextile.

If not otherwise specified by the manufacturer, all plastic membranes shall have a cover of earth or earth and gravel not less than 5 inches thick. Rubber membranes need not be covered unless livestock will travel the area. In areas where livestock will have access, a minimum cover of 9 inches shall be used on all types of flexible membranes. The soil material in the bottom 3 inches of soil cover over the liner shall not be coarser than silty sand.

Cover material shall be stable under all operational and exposure conditions. For covered liners, side slopes shall be 3:1 or flatter unless otherwise recommended by the manufacturer.

Subgrade preparation shall conform to manufacturer recommendations. Subgrade materials shall not contain sharp, angular stones or any other objects that could damage the liner.

Manufacturer's recommendations shall be followed with regard to protection from weather and exposure.

Venting shall be used. Venting shall follow the manufacturer's recommendations regarding vent type and spacing.

If high water tables could adversely affect the proper functioning of the facility, interceptor or relief type drainage systems shall be used to control uplift pressures.

All structures shall be fenced for the safety of humans, livestock, wildlife and pets and to protect the liner from damage during construction and after completion.

CONSIDERATIONS

Service life should be considered when selecting type of liner.

Consider using other measures to armor liners for ponds where concentrated flow enters the pond.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for specific field sites in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended uses.

OPERATION AND MAINTENANCE

Operation and maintenance of the liner will be consistent with the recommendations from the manufacturer. Liners that require soil coverings, to protect from ultraviolet light, shall have any uncovered portions recovered immediately.

Liners shall be protected from livestock and/or equipment traffic and from the operation of agitation equipment and pumps. Any tears or holes in the liner shall be repaired immediately to prevent leakage or further damage to the liner.